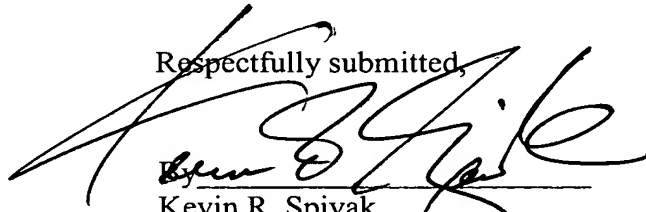## REMARKS

The claims have been amended in the attached Preliminary Amendment to place the application in proper U.S. format and to conform with proper grammatical and idiomatic English. None of the amendments herein are made for reasons related to patentability. <u>No new matter has been added</u>.

In the event the U.S. Patent and Trademark Office determines that an extension and/or other relief is required, applicant petitions for any required relief including extensions of time and authorizes the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to **Deposit Account No. 03-1952** referencing docket no. **44912-2080300.** However, the Commissioner is not authorized to charge the cost of the issue fee to the Deposit Account.

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Respectfully submitted,

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~~Description~~

Communications network planning system, method for
5   creating communications network diagrams and control
program for a communications network planning system.

CLAIM FOR PRIORITY
This application claims priority to International Application
10   No. PCT/EP2003/10173, which was published in the German
language on September 12, 2003, which claims the benefit of
priority to German Application No. 02020646.2 which was filed
in the German language on September 12, 2002, the contents of
which are hereby incorporated by reference.
15

TECHNICAL FIELD OF THE INVENTION
The present invention relates to a communications network
planning system, method for creating network diagrams and
control program for same.
20

BACKGROUND OF THE INVENTION
EP 1 098 474 A1 describes a communications network
modeling system which incorporates a network data model,
and which both creates and manages a database of
25   functions and a database of devices. The database of
functions and the database of devices are linked to each
other, and are used for the creation of a network model
incorporating paths and connections. A control device has
an interactive relationship with one or more system
30   modules, which use the network data model for special
functions, for example network planning.

EP 0 460 843 A2 discloses a computerized network planning

installation which has a display device for showing a
communications network which has numerous nodes. To each
of the nodes are assigned numerous subordinate nodes,
with the subordinate nodes having a predefined traffic
5   link to the assigned node and to at least one other node.
In response to a user input, subordinate nodes which are
assigned to a selected node are determined. In addition,
the subordinate nodes which have a more intensive traffic
link to the one or more nodes other than the selected
10 node are determined, so that a change of assignment can
be made, if appropriate.

Until now, network planning or network documentation
facilities have broken down the representation of a
15 network into an overview diagram, schematic diagram and
inventory diagram of the complete system or selected
subnetworks, as applicable. Different subnetworks are
generally not represented in a uniform and systematic
way. When different representations are compared or
20 analyzed, this often leads to misinterpretations, when
representations which have a similar appearance ought
actually to be interpreted differently.

SUMMARY OF THE INVENTION

25 The ~~object underlying the~~ present invention ~~is thus to
devise~~discloses a communications network planning system
for the comprehensible, compact representation of
informative data for effective network planning, a method
for creating corresponding communications network
30 diagrams and a suitable control program for the
communications network planning system.

~~In accordance with the invention, this object is achieved by a communications network planning system with the characteristics specified in Claim 1, a method with the~~
~~characteristics specified in Claim 6 and a control program with the characteristics specified in Claim 7. Advantageous developments of the present invention are specified in the subclaims.~~

~~An essential aspect~~In one embodiment of the present invention, ~~consists in the~~there is uniform representation of subnetworks with hierarchically structured details of the node types present in the subnetwork concerned and of the links which exist between the node types. This makes possible a reliable and rapid analysis of the representations of different subnetworks. Furthermore, the topologies of subnetworks can be compared relative to each other, using a combined graphical representation of subnetworks which are linked to one another, showing an extract of each in the region of an interface between them. This assists in avoiding any combination of functions from different subnetworks which have no direct topological link.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention is explained in more detail below for an exemplary embodiment, ~~by~~ with reference to the exemplary drawings, in which~~. This shows~~:

Figure 1   an overview, displayed on a graphical user
            interface of a communications network planning
            system, of subnetworks within a communications
            network₮.

5

Figure 2   a representation of a subnetwork on the
            graphical user interface, with details of the
            functionality of the node types which are
            present in the subnetwork₮.

10

Figure 3   a representation of a subnetwork on the
            graphical user interface, with details of the
            node counts and node locations₮.

15   Figure 4   a representation of a subnetwork on the
            graphical user interface, with details of the
            infrastructure installation products and their
            vendors₮.

20   Figure 5   a combined representation on the graphical user
            interface of an extract from each of two
            subnetworks which are connected to each other,
            in the region of a subnetwork interface.

25

DETAILED DESCRIPTION OF THE INVENTION

Figure 1 shows an overview 100, displayed on a graphical
user interface of a communications planning system, of
subnetworks 101-107 within a communications network. The
30   communications network planning system is realized, for
example, by a normal data processing system, not shown,

on which an operating system with a graphical user
interface is installed. The overview 100 of the
subnetworks 101-107 is displayed, for example, in a
special display area of a display device assigned to the
5   data processing system. In the context of computer
operating systems with graphical user interfaces, such a
display area is also called a window. In the present
exemplary embodiment, the communications network
incorporates a subscriber-side access network 101, a
10   digital trunk dialing network 102 using time division
multiplex (TDM) technology, a mobile telephony network
103, special networks 104, an ATM network (ATM -
asynchronous transfer mode), a packet data network 106
using IP technology (IP - internet protocol) and an SDH
15   transport network 107 (SDH - synchronous digital
hierarchy).

In addition, the overview 100 of the subnetworks 101-107
incorporates selectors 111-117 for selecting a graphical
20   representation of each of the subnetworks 101-107. The
selectors 111-117 are implemented, for example, using a
hyperlink technique, so that the graphical representation
of the subnetwork concerned, 101-107, can be called up by
selecting a text or graphic element, as applicable,
25   assigned to the hyperlink.

In addition to the above, the overview 100 of the
subnetworks 101-107 incorporates selectors 121-125, 131-
135 for selecting a combined graphical representation for
30   subnetworks which are linked to each other, showing an
extract of each in the region of a subnetwork interface.

By selecting a graphic element assigned to the relevant selector 121-125, 131-135, the desired combined graphical representation of a subnetwork interface can be called up.

5

The selectors 111-117, 121-125, 131-135 can be activated by means of an input unit, which is not shown in more detail, which is assigned to the data processing system used to realize the communications network planning

10 system. The data processing system has in addition a control unit for activating the graphical user interface in accordance with the selection inputs received from the input unit. For the purpose of controlling the communications network planning system, a control program

15 is provided, and this can be loaded into a working memory of the data processing system and has at least one section of code such that, when it is being executed – that is when the control program runs – the steps explained as part of the description of the present

20 exemplary embodiment are worked through.

After activation of a selector 111-117 for the purpose of making a graphical selection of a subnetwork 101-107, the graphical representation of the selected subnetwork is

25 output on the graphical user interface of the communications network planning system. In the considerations which follow it is assumed that selector 112 for the digital trunk dialing network 102 has been activated. A representation 200 of the digital trunk

30 dialing network 102 is then output on the graphical user interface, with details of the functionality of the node

types present in the digital trunk dialing network 102,
as shown in Figure 2.

The representation 200 of the digital trunk dialing
5   network 102 incorporates hierarchically structured
details of node types 201-206 which are present in the
digital trunk dialing network 102 and a representation of
the links which exist between these node types 201-206.
The links thus represent connections or paths. The node
10   types present in the digital trunk dialing network 102
include main distribution frames 201, parent exchanges
202, subscriber exchanges 203, node exchanges 204, trunk
exchanges 205 and international gateway exchanges 206.
Here, the hierarchically structured details of the node
15   types 201-206 present in the digital trunk dialing
network 102 are output according to the network hierarchy
level to which the node types concerned 201-206 can be
assigned, between the subscribers 211 and the core
network 212. Accordingly, the node types 201-206 present
20   in the digital trunk dialing network 102 are arranged in
a hierarchically descending sequence, first into inter-
national gateway exchanges 206, then into trunk exchanges
205, node exchanges 204, subscriber exchanges 203 and
parent exchanges 202, and finally into main distribution
25   frames 201. To each of the node types 201-206 present in
the digital trunk dialing network 102 are assigned
details 221-223 about their particular functionality,
which are incorporated by the representation 200 of the
digital trunk dialing network 102 as shown in Figure 2.
30   For example, assigned to the main distribution frame 201
are the details 221 "Scheduling of ISDN/analog subscriber

lines". In a corresponding manner, the details 222 "Local
ISDN/analog switching" are assigned to the parent
exchanges 202 and the subscriber exchanges 203. In
addition, the details 223, "Switching in the node
5   exchange region" are assigned to the node exchanges 204.

The representation 200 of the digital trunk dialing
network 102, on the graphical user interface of the
communications network planning system, shown in Figure
10 2, incorporates in addition a selector 231 for selecting
a network overview corresponding to Figure 1, and
selectors 232 for selecting representations 300, 400 of
the digital trunk dialing network 102 with details
respectively of the node counts and node locations, as
15 shown in Figure 3, or with details of the infrastructure
installation products and their vendors, as shown in
Figure 4.

The representation 300 of the digital trunk dialing
20 network 102 in Figure 3 incorporates hierarchically
structured details of the node types 301-306 present in
the digital trunk dialing network 102 and details of the
links which exist between these node types 301-306 and,
in this respect, corresponds to the representation 200 of
25 the digital trunk dialing network 102 as shown in Figure
2. Again, all the node types 301-306 are arranged, as
shown in Figure 3, according to the network hierarchy
level to which the node types 301-306 concerned can be
assigned, between the subscribers 311 and the core
30 network 312. By comparison with the representation 200 of
the digital trunk dialing network 102 as shown in Figure

2, the representation 300 of the digital trunk dialing
network 102 shown in Figure 3 incorporates, in place of
the details 221-223 about the functionality of the node
types 201-206 concerned, details 321-324 about numbers of
5   nodes per node type and about numbers of locations per
node type. Here too, the numbers of locations can be
summarized for several node types. Like the
representation 200 of the digital trunk dialing network
102 shown in Figure 2, the representation 300 of the
10   digital trunk dialing network 102 shown in Figure 3 has a
selector 331 for selecting a network overview as shown in
Figure 1, and selectors 332 for selecting a
representation of the digital trunk dialing network 102,
showing alternative details.
15

The representation 400 of the digital trunk dialing
network 102 as shown in Figure 4 is hierarchically
structured, in the same way as the representations 200,
300 shown in Figures 2 and 3. Thus, node types 401-406
20   present in the digital trunk dialing network 102 are
output according to the network hierarchy level to which
they can be assigned, between the subscribers 411 and the
core network 412. Instead of the details 221-223 about
the functionality of the node types 201-206, the
25   representation 400 of the digital trunk dialing network
102 shown in Figure 4 incorporates details 421-425 about
infrastructure installation products and details 426
about the vendors of these infrastructure installation
products. The level of detail in the vendor information
30   can here be arranged so that it incorporates a statement
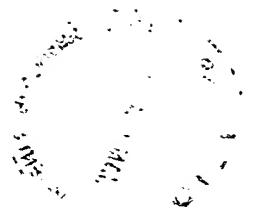about the vendors, as a percentage across all the node

types 401-406 considered. The representation 400 of the
digital trunk dialing network 102 shown in Figure 4 again
incorporates a selector 431 for selecting a network
overview as shown in Figure 1 and selectors 432 for
5   selecting alternative types of representation of the
digital trunk dialing network 102.

Figure 5 shows a combined representation 500 of the
graphical user interface of the communications network
10   planning system, incorporating an extract from each of
two mutually linked subnetworks, in the region of a
subnetwork interface. A representation 500 of this type
can be selected by activating one of the selectors 131-
135, shown in Figure 1, for selecting a representation of
15   a subnetwork interface. We consider below the case in
which a representation of a subnetwork interface, between
the digital trunk dialing network 102 and the SDH
transport network 107, is selected. The representation
500 of the subnetwork interface between the digital trunk
20   dialing network 102 and the SDH transport network 107
incorporates hierarchically structured details of node
types 511, 512 which are present in the subnetwork
interface region concerned 501, 502, and details of
subnetwork tie lines 521-525 which exist between these
25   node types 511, 512. In an analogous way to the
hierarchically structured representation 200, 300, 400 of
the digital trunk dialing network 102, as shown in
Figures 2 to 4, the node types 511, 512 which are present
in the subnetwork interface regions concerned are
30   structured according to the network hierarchy level to
which they can be assigned, between the subscriber access

and transport networks. In addition, the representation
500 of the subnetwork interface between the digital trunk
dialing network 102 and the SDH transport network 107 as
shown in Figure 5 has a selector 531 for selecting a
5   network overview, as in Figure 1.

In addition to the selectors 231-232, 331-332, 431-432,
531 as shown in Figures 2 to 5, the representations 200,
300, 400, 500 can also have a selector for printing out a
10   graphical representation of the subnetwork concerned, or
a selector for printing out a combined graphical
representation of extracts of each of the interlinked
subnetworks in the region of a subnetwork interface. A
printer, linked to the communications network planning
15   system either directly or via a network, can be activated
to print out communications network diagrams, in
accordance with the selection details received on input
units assigned to the communications network planning
system. In this way, it is possible to generate
20   communications network diagrams which correspond
essentially to the representations 200, 300, 400, 500 of
a subnetwork or a subnetwork interface, as applicable,
shown in Figures 2 to 5.

25   The use of the present invention is not restricted to the
exemplary embodiment described here.

~~Claims~~What is claimed is: